

How Important is Bushmeat Consumption in South America: Now and in the Future?

Jonathan Rushton, Rommy Viscarra, Cecilia Viscarra, Frederick Basset, Rene Baptista and David Brown

Between 5 to 8 million people in South America rely regularly on bushmeat as a source of protein in their diets. This represents only 1.4 to 2.2% of the total continental population, but these people are likely to be some of the poorest in the region. In terms of its contributions to the overall supply of meat in the region, bushmeat would appear to have very little importance. The future importance of bushmeat will depend on two factors: the economic growth of the South American economies and the ability of the livestock and fishery sectors to supply affordable protein. If both of these factors are positive over the next time period, it is suggested that bushmeat will further reduce in importance both in terms of the number of people who consume such meat and the total quantity of meat consumed. Improvement in people's livelihoods in the Amazon region might well reduce bushmeat consumption and hence hunting pressures. However, the limitations in the data available on consumption patterns and changing preferences over time suggest a need for caution on the likely future scenarios.

Policy Conclusions

- South American livestock and fishery sectors have responded positively to increasing protein demand over the 90s and have successfully increased supply to both national and international markets.
- In terms of supplying protein to the South American population, bushmeat is not very important, and bushmeat consumption in South America is concentrated in the areas where the wildlife populations are found.
- The main populations who demand bushmeat are indigenous people, rural communities and migratory workers. These people are generally poor and bushmeat consumption is an important aspect of their livelihoods.
- Economic growth of South American countries and the ability of the livestock and fishery sectors to supply reasonably priced protein are potential factors in reducing hunting pressures through the lowering of bushmeat demand.
- When estimating levels of bushmeat consumption, it is important to correlate findings with extra-sectoral data, for example, regarding levels of protein deficiency and anaemia.
- Aggregate bushmeat consumption could be a useful means of determining hunting pressures in South America, but future predictions require research to provide accurate information on:
 - Human population movements and economic activities of different groups.
 - Bushmeat consumption levels in all population groups where wildlife are found.
 - How bushmeat consumption is affected in all population groups by access to alternative protein sources and changes in income and education levels.

Introduction

To understand bushmeat consumption it is necessary to put the demand for this protein into the context of:

- Socio-economic development
 - Income
 - Education
 - Migratory patterns
- Cultural preferences
- Accessibility of the bushmeat eating population to other forms of protein.

The paper will first present data and information on the South American livestock sector and the consumption of protein sources by the general population. This will be followed by a section presenting information on the consumption of bushmeat in the sub-continent, taking into account socio-economic development issues and cultural preferences.

Animal production and protein consumption in South America

South America has some of the most important livestock production systems in the world and is an aggressive exporter of beef, pork and poultry to all parts of the world (Rushton and Viscarra, 2004). This production, however, is not evenly distributed across the sub-continent:

- Cattle production is concentrated in the central eastern region between the Argentinean province of Buenos Aires to the Brazilian State of Sao Paulo.
- Pig and poultry production is concentrated in the Brazilian States of Rio Grande do Sul, Santa Catarina and Paraná
- Sheep and camelid production is concentrated in the high Andean regions of Bolivia and Peru. It is noted that the large sheep populations in Argentina and Uruguay have halved over the last ten years.

In terms of the supply of meat and protein the continent can be divided into two regions. The eastern region has a surplus

production of meat and is an important exporter of livestock products. The western and northern region has a protein deficit and government policies have focussed on filling this deficit through intensive pig and poultry production systems. Within this deficit region, Chile has been particularly successful in promoting livestock production systems that are able to satisfy the majority of the national demand and also to supply international markets. These two regions are effectively separated by the Andes and the Guiana Highlands.

With regards to protein consumption data are available on meat and livestock product consumption for Andean countries (Bolivia, Peru, Colombia and Venezuela); the Southern Cone (Argentina, Chile, Paraguay, Uruguay) and Brazil. The highest consumption levels are in the Southern Cone where 130 kg of meat equivalents are consumed per person per year. Throughout South America it is estimated that protein consumption has increased over the 90s, but this has largely been due to increases in poultry consumption (Pomareda, 2002).

Fish consumption in South America was estimated to be 3.3 million tonnes in 1997 with an average per capita consumption of 10 kg per person per year. However, there are variations across the continent with estimates for Ecuador of 9 kg per person per year, whereas the poor and landlocked Bolivia consumption has been estimated to be as low as between 0.5 to 1.0 kg per person per year. Countries such as Chile and Peru have a greater reliance on fish as a source of protein and are also important exporters of fish products.

It can be concluded that South America has a strong livestock sector in the eastern zone, which is capable of supplying protein to populations that are both growing and in the majority of the countries becoming richer. In the western and northern zones, the livestock sectors are less able to supply protein, and the response has been to encourage intensive pig and poultry systems and also rely on fish production. It is also noted that this protein deficit zone does not correspond to the geographical areas where wildlife populations are under threat due to hunting and bushmeat consumption. Given that the South American livestock and fishery sectors are responding positively to increasing demands for protein, what is the current and future role of bushmeat?

How important is bushmeat in the protein diet in South America?

The main studies on bushmeat consumption have focussed on the human population in the Amazon region, which is appropriate as this region is the largest land mass and contains important wildlife and human populations. According to FAO (1995) the Amazonian population is approximately 20 million people or 5.7% of the total South American population. FAO divided this population into the following groups:

- 1. Indigenous** people who maintain a traditional lifestyle. These people make up 5% of the Amazonian population and total approximately a million people. It is reported that the indigenous population is increasing due to improved access to basic healthcare. Hunting and consumption of bushmeat is an important part of this group's livelihood strategy.
- 2. Rural communities** who are small-scale farmers and other rural based people. This population are mixed origin: European, African and indigenous. Use of forest flora and fauna is important to these people. The more recent settlements are involved in small-scale agriculture, and working for forestry, oil and construction companies. FAO state that the forest workers are particularly aggressive users of wildlife. It is reported that this group make up 20% of the Amazonian population or 4 million people.

- 3. Urban population** who make up 60% of the Amazon population or 12 million people. These people live in the cities and towns of the Amazon. Their demand and use of bushmeat is not available, but FAO state that this group have an interest in hunting for sport.
- 4. The remaining population** (15% or 3 million) can be described as **floating** and can be divided into:
 - a. Migratory workers** who are involved in a wide range of activities as miners, civil servants, researchers, drug traffickers and guerrillas.
 - b. Tourists.**

The majority of the human population found in the Amazon region are not in direct contact with wildlife, and data on their consumption of and preference for bushmeat are very limited. Data on the consumption and preference for bushmeat by the rural communities and migratory workers are also limited. However, there are data on bushmeat consumption for indigenous populations in different regions (see Box 1).

Box One: Bushmeat consumption for different indigenous groups in South America (data from Ojasti 1996; estimated of annual consumption by the authors).

Indigenous group and country	Fresh meat consumption (g/day/person)	Protein Supply*	Annual consumption of bushmeat (kg/yr) based on: <i>deadweight</i>	<i>liveweight**</i>
Bari, Colombia	98	19	35.8	21.5
Cuiba, Colombia	525	105	191.6	115.0
Jívaro, Peru and Ecuador	278	56	101.5	60.9
Kainsang, Brazil	95	19	34.7	20.8
Mishito, Nicaragua	86	17	31.4	18.8
Sharanahua, Peru	273	54	99.6	59.8
Shipibo, Peru	47	9	17.2	10.3
Siona, Secoya, Ecuador	205	41	74.8	44.9
Sirinó, Bolivia	219	44	79.9	48.0
Trio, Suriname	130	26	47.5	28.5
Yanomano, Venezuela	143	29	52.2	31.3
Yékwana, Venezuela	159	32	58.0	34.8
Yukpa, Venezuela	28	7	10.2	6.1
Average	187	37	68.3	41.0

*1g of meat contributes 0.2g of protein.

**killing out percentage of 60%.

In order to have some idea of the importance of bushmeat production in the general livestock economy, the proportion of the Brazilian meat supply that comes from bushmeat was estimated. These estimates are based on data from a wildlife study (Peres, 2000) and a South American livestock systems study (Rushton and Viscarra, 2004). Depending on the bushmeat production per year, which varies enormously, bushmeat provides between a quarter and half a percent of the total meat supply in Brazil and is important for 2% of the Brazilian population (see Box 2).

Box Two: Comparison of the estimates of Brazilian bushmeat production with the Brazilian domestic meat production (bushmeat production based on estimates by Peres 2000 and Brazilian livestock production from Rushton and Viscarra, 2004)

Estimate of Brazilian bushmeat production	Meat production ('000 tons/yr)		Bushmeat production as a % of domestic meat production	Estimate of the Brazilian Indigenous and Rural Population	Bushmeat consumption per capita (kg/yr)
	<i>Bushmeat</i>	<i>Domestic</i>			
Low	41	16,750	0.24%	2,965,000	14
High	96	16,750	0.57%	2,965,000	32

Future demand for Bushmeat in South America

There are two important aspects in future predictions of bushmeat demand:

- Information on cultural preference for the product and how people's consumption preferences changes with increases or decreases in income. The cultural preference needs to recognise that there are alternatives or substitutes to bushmeat.
- Changes in the size of the population who are demanding bushmeat.

Access to protein substitutes would be expected to affect the consumption of bushmeat and if it did not then there would be a very strong argument that bushmeat was a very important cultural product. Data collected by the authors would suggest that bushmeat could be replaced in the diet.

- Data on the consumption of different protein sources shows that bushmeat makes up only between a sixth to a third of the protein diet of indigenous and local communities (see Box 4).
- The Amazon forests are well known to have river systems and a good supply of river fish species (Fa and Peres, 2000). Fish make up a large proportion of the protein diet of many indigenous and rural communities. Work carried out in Iquitos, Peru shows that demand and prices for peccary meat varies with supply of fish (Bodmer, et al. forthcoming).
- In Bolivia, studies have found that fishing is a preferred activity over hunting as a source of protein as it involves the whole family and in general it is a more effective means of satisfying protein needs.
- Bolivian studies in the Chaco (dry forest system in the Department of Santa Cruz) and the Tropical Pampa of the Beni demonstrate that access to beef reduces the consumption of bushmeat.

In general, hunting and bushmeat consumption are poverty related activities. Evidence from Africa would suggest that hunting and bushmeat consumption are fall back activities when

economies fail to provide opportunities. The situation in South America is similar in that hunting and bushmeat consumption are associated with poverty. The critical difference between the continents, however, is that in general the South American economies have grown over the last 20 years, and have provided alternative economic opportunities for people to get richer. Data from French Guyana and a study by Wilkie and Godoy (2001) would suggest that as people get richer their consumption of bushmeat falls.

The increasing human populations in the Amazon region could potentially increase the number of people who demand bushmeat. However, if the South American economies continue to grow the majority of this population increase may be absorbed into urban areas where bushmeat demand is low and where there is good access to other protein sources. In addition, if the livestock and fish sectors continue to provide affordable protein sources, population growth could be balanced by a reduction in individual demand for bushmeat. Reaching definitive conclusions on future aggregate demand is not possible due to the lack of data on consumption per person for the rural, urban and migratory populations and doubts over the quality of the consumption data for indigenous groups. The estimates for the latter group are much higher than for protein consumption in other regions of South America (compare Boxes 1, 2 and 3) and would not seem to agree with studies that report high levels of anaemia and general protein deficiency. Whatever the facts of the case, this does highlight the need to reconcile bushmeat consumption estimates with poverty and health studies.

In order to highlight the difficulties in estimations, different scenarios are presented in Box 4.

Given the current economic growth and potential of the livestock and fishery sectors, there is reason to suggest that bushmeat demand will reduce in the future and this in turn will reduce hunting pressures. However, there is a need to temper this scenario as the size and the actions of the migratory population are unknown and could have a large impact.

Box Three: Protein consumption by indigenous people in the Amazon (grams per day) (Data from Ayres et al 1991; Pacheco et al 1991 and PNUMA, 1987).

Protein Source	Peru Studies		Amazon in General %
	Average (g/day)	%	
Fish	188	63.9	44.8
Bushmeat	69	23.5	19.9
Poultry	25	8.5	7.5
Pork	11	3.9	3.3
Beef	15	5.1	14.3
Others			10.2
Total (g/day)	295	100.0	100.0
Total (kg/year)	108		

Rommy Viscarra, Veterinary Epidemiologist, CEVEP;
 Cecilia Viscarra, Research Consultant, CEVEP;
 Frederick Basset, Independent Consultant, <http://frederickbasset.webheberg.com>;
 Rene Baptista, Research Consultant, CEVEP.

Conclusions

Bushmeat in South America is not of great importance in terms of either of the proportion of people in a population who eat bushmeat nor in terms of its contribution to the livestock and fisheries economy. The future importance of bushmeat depends on population growth of regular bushmeat eaters and how the preferences for bushmeat will change over time in these populations. Populations that traditionally demand bushmeat are increasing due to better healthcare and populations of other groups in the Amazon forest areas are increasing where countries have pursued policies of opening up forest areas. However, opening up forest areas will also increase access to other sources of protein, and bushmeat consumption is influenced by the availability and price of other protein sources. Even where access to other sources of protein is poor, bushmeat is not the most important source of protein for indigenous groups. Finally data from different regions of the continent would suggest that

Box Four: The potential future scenarios for bushmeat demand in South America

Factor	Scenario		
	1	2	3
Population	Indigenous, rural and migratory populations increase. Urban population remains constant with some urban to rural migration	Indigenous, rural and migratory populations remain constant. Population growth in the urban populations with some rural to urban migration	Indigenous, rural and migratory populations reduce. Population growth in the urban populations with strong rural to urban migration.
Economic Growth	Negative	Little growth in the Amazon Region	Growth in the Amazon Region
Livestock and Fishery Sectors	Little growth in the Amazon region	Growth in the Amazon region, which keeps pace with urban demand	Strong growth in the Amazon region, which keeps pace with urban and rural demand
Individual Bushmeat	Slightly increased Demand	Remains the same	Reduces
Aggregate Bushmeat Demand and Hunting Pressures	Increased strongly leading to greater hunting pressures which could endanger a range of species	Remains the same with hunting pressure creating problems for susceptible species such as the Tapir	Reduces and hunting pressures are also reduced

increasing income reduces bushmeat consumption.

The implications of the observations from this policy briefing are as follows:

- Economic development in forest areas could have the following impacts:
 - Increases in human populations.
 - Greater destruction of forest habitats.
 - Reductions in individual demand for bushmeat as people get richer and have greater access to other forms of protein.
- Conclusions on total bushmeat demand cannot be determined without
 - Classification of populations who eat bushmeat.
 - Population size and growth rates of each group.
 - Demand characteristics of each group.
 - Changing characteristics of each group in terms of income levels and education.

The first two exist, but the latter two are not of adequate quality to develop estimates and draw conclusions.

- In order to estimate total bushmeat demand there is a need for monitoring studies on bushmeat consumption in terms of:
 - Changes in populations.
 - Consumption of bushmeat.
 - Influence of income, education and availability of substitutes on bushmeat consumption.

Such data collection and analysis processes would be a good method of assessing bushmeat production levels and hunting pressures.

References

- Ayres, J. M. et al. (1991) 'On the Track of the road: changes in subsistence hunting in a Brazilian village', in J.G. Robinson and K.H. Redford. Eds. *Neotropical wildlife use and conservation*. Univ. Chicago Press, 82-92.
- Bodmer, R.E. et al. (2000) 'Economic Analysis of Wildlife Use in the Peruvian Amazon', in Silvius, K. et al. (eds.) *People in Nature: Wildlife Conservation in South and Central America*, Columbia University Press, New York.
- FAO (1995) *Uso y Conservación de la Fauna Silvestre en la Amazonía*. Tratado de Cooperación Amazónica TCA. Secretaría Pro-Tempore. Lima-Perú.
- Fa, J.E. and Peres, C.A. (2001) 'Game vertebrate extraction in African and Neotropical forests: an intercontinental comparison' in Reynolds, J.D. et al. (Eds.), *Conservation of Exploited Species*. Cambridge University Press, Cambridge,

- 203-241.
- Ojasti, J. (1996) 'Wildlife Utilization in Latin America: Current Situation and Prospects for Sustainable Management' *FAO Conservation Guide* – 25. FAO, Rome, Italy.
- Pacheco, T., et al. (1991) 'Importancia de la Fauna Silvestre en la alimentación de los pobladores de la cuenca media de Nanay Loreto-Perú' in *Resúmenes del I Congreso Nacional de Ecología*. Simposio Internacional de Ecología Tropical Amazónica, Iquitos-Perú.
- PNUMA (1987) *Estudio de casos de manejo ambiental: desarrollo integrado de un area de los tropicos humedos – selva central de Peru*. Organización de los Estados Americanos, Washington DC, USA.
- Pomareda, C. (2002) *El Sector Pecuario en América Latina y El Caribe: Condiciones Estructurales, Evolución (1990-2000) y Perspectivas (2010, 2020, 2030)*. Informe preparado para FAO, Dirección General de Ganadería, Roma, Italia.
- Rushton J. and Viscarra, R.E. (2004) 'Livestock Production Systems in South America – Analysis and Trends.' *Report for a study on livestock production systems in South America for FAO*. Rome, Italy. 33 pages.
- Wilkie, D.S. and Godoy, R.A. (2001) 'Income and price elasticities of Bushmeat Demand Lowland Amerindian Societies', *Conservation Biology*, 153, 761-769.

Corresponding authors:

- a Jonathan Rushton (rushtonjonathan@yahoo.com), Livestock Economist and Managing Director, CEVEP;
- b Rommy Viscarra, Veterinary Epidemiologist, CEVEP;
- c Cecilia Viscarra, Research Consultant, CEVEP;
- d Frederick Basset, Independent Consultant, <http://frederickbasset.webheberg.com>;
- e Rene Baptista, Research Consultant, CEVEP;

Series editor: David Brown (d.brown@odi.org.uk)

Administrative editor: Christina Panagiotopoulos C.Panagiotopoulos@odi.org.uk

ISSN 1742 - 6022